

IN THE CLAIMS

1. (Previously amended) A method of reducing a channel length in a transistor, comprising:
forming a gate dielectric layer on a semiconductor substrate;
coupling a barrier layer to the gate dielectric layer, wherein the barrier layer prevents oxide undergrowth;
forming a gate on top of the barrier layer, the gate having sides, and an effective channel length defined by the sides and an amount of overlap between the sides of the gate and a pair of source/drain regions; and
oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced.
2. (Original) The method of claim 1, wherein coupling a barrier layer to the gate dielectric layer comprises coupling a silicon nitride (SiN) layer to the gate dielectric layer.
3. (Previously Amended) The method of claim 2, wherein coupling a silicon nitride (SiN) layer to the gate dielectric layer comprises remote plasma nitride processing to form a silicon nitride (SiN) layer.
4. (Previously Amended) The method of claim 1, wherein coupling a barrier layer to the gate dielectric layer comprises composite oxidation processing to form a barrier layer.
5. (Original) The method of claim 1, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate oxide layer on a semiconductor substrate.
6. (Original) The method of claim 1, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate dielectric layer on a silicon substrate.

7. (Previously Amended) A method of forming a transistor, comprising:
forming a first source/drain region and a second source/drain region in a semiconductor substrate;
forming a gate dielectric layer on the semiconductor substrate;
coupling a barrier layer to the gate dielectric layer, wherein the barrier layer prevents oxide undergrowth;
forming a gate on top of the barrier layer, the gate having sides, and an effective channel length defined by the sides; and
oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced.
8. (Original) The method of claim 7, wherein coupling a barrier layer to the gate dielectric layer comprises coupling a silicon nitride (SiN) layer to the gate dielectric layer.
9. (Previously Amended) The method of claim 8, wherein coupling a silicon nitride (SiN) layer to the gate dielectric layer comprises remote plasma nitride processing to form a silicon nitride (SiN) layer.
10. (Previously Amended) The method of claim 7, wherein coupling a barrier layer to the gate dielectric layer comprises composite oxidation processing to form a barrier layer.
11. (Original) The method of claim 7, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate oxide layer on a semiconductor substrate.
12. (Original) The method of claim 7, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate dielectric layer on a silicon substrate.
13. (Original) The method of claim 7, further including forming a first source/drain extension adjacent the first source/drain region and a second source/drain extension adjacent the second source/drain region.

14. (Previously Amended) A method of forming a transistor, comprising:
forming a first source/drain region and a second source/drain region in a semiconductor substrate;
forming a gate dielectric layer on the semiconductor substrate;
coupling a nitride layer to the gate dielectric layer, wherein the nitride layer prevents oxide undergrowth;
forming a gate on top of the nitride layer, the gate having sides, and an effective channel length defined by the sides; and
oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced.
15. (Original) The method of claim 14, wherein coupling a nitride layer to the gate dielectric layer comprises coupling a silicon nitride (SiN) layer to the gate dielectric layer.
16. (Previously Amended) The method of claim 15, wherein coupling a silicon nitride (SiN) layer to the gate dielectric layer comprises remote plasma nitride processing to form a silicon nitride (SiN) layer.
17. (Previously Amended) The method of claim 14, wherein coupling a barrier layer to the gate dielectric layer comprises composite oxidation processing to form a barrier layer.
18. (Original) The method of claim 14, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate oxide layer on a semiconductor substrate.
19. (Original) The method of claim 14, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate dielectric layer on a silicon substrate.

20. (Original) The method of claim 14, further including forming a first source/drain extension adjacent the first source/drain region and a second source/drain extension adjacent the second source/drain region.

21. (Previously Amended) A method of forming an integrated circuit, comprising:
forming a number of transistors on a semiconductor substrate, wherein
forming at least one of the number of transistors comprises:

forming a first source/drain region and a second source/drain region in the semiconductor substrate;

forming a gate dielectric layer on the semiconductor substrate;

coupling a barrier layer to the gate dielectric layer, wherein the barrier layer prevents oxide undergrowth;

forming a gate on top of the barrier layer, the gate having sides, and an effective channel length defined by the sides;

oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced; and

electrically connecting the number of transistors.

22. (Original) The method of claim 21, wherein coupling a barrier layer to the gate dielectric layer comprises coupling a silicon nitride (SiN) layer to the gate dielectric layer.

23. (Previously Amended) The method of claim 22, wherein coupling a silicon nitride (SiN) layer to the gate dielectric layer comprises remote plasma nitride processing to form a silicon nitride (SiN) layer.

24. (Previously Amended) The method of claim 21, wherein coupling a barrier layer to the gate dielectric layer comprises composite oxidation processing to form a barrier layer.

25. (Original) The method of claim 21, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate oxide layer on a semiconductor substrate.

26. (Original) The method of claim 21, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate dielectric layer on a silicon substrate.

27. (Previously Amended) A method of forming an integrated circuit, comprising:
forming a number of transistors on a semiconductor substrate, wherein
forming at least one of the number of transistors comprises:

forming a first source/drain region and a second source/drain region in the semiconductor substrate;

forming a first source/drain extension adjacent the first source/drain region and a second source/drain extension adjacent the second source/drain region;

forming a gate dielectric layer on the semiconductor substrate;

coupling a barrier layer to the gate dielectric layer, wherein the barrier layer prevents oxide undergrowth;

forming a gate on top of the barrier layer, the gate having sides, and an effective channel length defined by the sides;

oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced; and

electrically connecting the number of transistors.

28. (Previously Amended) A method of forming an integrated circuit, comprising:
forming a number of transistors on a semiconductor substrate, wherein
forming at least one of the number of transistors comprises:

forming a first source/drain region and a second source/drain region in the semiconductor substrate;

forming a gate dielectric layer on the semiconductor substrate;

coupling a nitride layer to the gate dielectric layer, wherein the nitride layer prevents oxide undergrowth;

forming a gate on top of the nitride layer, the gate having sides, and an effective channel length defined by the sides;

oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced; and

electrically connecting the number of transistors.

29. (Original) The method of claim 28, wherein coupling a nitride layer to the gate dielectric layer comprises coupling a silicon nitride (SiN) layer to the gate dielectric layer.

30. (Previously Amended) The method of claim 29, wherein coupling a silicon nitride (SiN) layer to the gate dielectric layer comprises remote plasma nitride processing to form a silicon nitride (SiN) layer.

31. (Previously Amended) The method of claim 28, wherein coupling a barrier layer to the gate dielectric layer comprises composite oxidation processing to form a barrier layer.

32. (Original) The method of claim 28, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate oxide layer on a semiconductor substrate.

33. (Original) The method of claim 28, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate dielectric layer on a silicon substrate.

34. (Original) The method of claim 28, further including forming a first source/drain extension adjacent the first source/drain region and a second source/drain extension adjacent the second source/drain region.

35. (Previously Amended) A method of forming a memory device, comprising:
forming a number of transistors on a semiconductor substrate, comprising:
forming a first source/drain region and a second source drain region in the semiconductor substrate;
forming a gate dielectric layer on the semiconductor substrate;
coupling a barrier layer to the gate dielectric layer, wherein the barrier layer prevents oxide undergrowth;
forming a gate on top of the barrier layer, the gate having sides, and an effective channel length defined by the sides;
oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced;
forming a number of wordlines coupled to the gates of the number of transistors; and
forming a number of bitlines coupled to the first source/drain region of the number of transistors.

36. (Original) The method of claim 35, wherein coupling a barrier layer to the gate dielectric layer comprises coupling a silicon nitride (SiN) layer to the gate dielectric layer.

37. (Previously Amended) The method of claim 36, wherein coupling a silicon nitride (SiN) layer to the gate dielectric layer comprises remote plasma nitride processing to form a silicon nitride (SiN) layer.

38. (Previously Amended) The method of claim 35, wherein coupling a barrier layer to the gate dielectric layer comprises composite oxidation processing to form a barrier layer.

39. (Original) The method of claim 35, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate oxide layer on a semiconductor substrate.

40. (Original) The method of claim 35, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate dielectric layer on a silicon substrate.

41. (Previously Amended) A method of forming a memory device, comprising:
forming a number of transistors on a semiconductor substrate, comprising:

forming a first source/drain region and a second source drain region in the semiconductor substrate;

forming a first source/drain extension adjacent the first source/drain region and a second source/drain extension adjacent the second source/drain region;

forming a gate dielectric layer on the semiconductor substrate;

coupling a barrier layer to the gate dielectric layer, wherein the barrier layer prevents oxide undergrowth;

forming a gate on top of the barrier layer, the gate having sides, and an effective channel length defined by the sides;

oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced;

forming a number of wordlines coupled to the gates of the number of transistors; and

forming a number of bitlines coupled to the first source/drain region of the number of transistors.

42. (Previously Amended) A method of making an information handling system, comprising:

providing a processor chip;

forming a semiconductor memory device, comprising:

forming a number of transistors on a semiconductor substrate, comprising:

forming a first source/drain region and a second source/drain region in the semiconductor substrate;

forming a gate dielectric layer on the semiconductor substrate;

coupling a barrier layer to the gate dielectric layer, wherein the barrier layer prevents oxide undergrowth;

forming a gate on top of the barrier layer, the gate having sides, and an effective channel length defined by the sides;

oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced;

forming a number of wordlines coupled to the gates of the number of transistors;

forming a number of bitlines coupled to the first source/drain region of the number of transistors; and

coupling the processor chip to the semiconductor memory device with a system bus.

43. (Original) The method of claim 42, wherein coupling a barrier layer to the gate dielectric layer comprises coupling a silicon nitride (SiN) layer to the gate dielectric layer.

44. (Previously Amended) The method of claim 43, wherein coupling a silicon nitride (SiN) layer to the gate dielectric layer comprises remote plasma nitride processing to form a silicon nitride (SiN) layer.

45. (Previously Amended) The method of claim 42, wherein coupling a barrier layer to the gate dielectric layer comprises composite oxidation processing to form a barrier layer.

46. (Original) The method of claim 42, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate oxide layer on a semiconductor substrate.

47. (Original) The method of claim 42, wherein forming a gate dielectric layer on a semiconductor substrate comprises forming a gate dielectric layer on a silicon substrate.

48. (Original) The method of claim 42, further including forming a first source/drain extension adjacent the first source/drain region and a second source/drain extension adjacent the second source/drain region.

49-53. (Previously Canceled)

Q/ 54. (Previously Amended) A transistor formed by the following process:
forming a first source/drain region and a second source/drain region in a semiconductor substrate;
forming a gate dielectric layer on the semiconductor substrate;
coupling a barrier layer to the gate dielectric layer, wherein the barrier layer prevents oxide undergrowth;
forming a gate on top of the barrier layer, the gate having sides, and an effective channel length defined by the sides; and
oxidizing the gate with sides of the gate dielectric exposed, wherein a portion of the sides of the gate are converted to an oxide and an effective channel length of the gate is reduced.
